

FORM PTO-1390 (Modified) (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 218082US6PCT	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 10/030191	
INTERNATIONAL APPLICATION NO. PCT/EP00/10109		INTERNATIONAL FILING DATE 13 October 2000		PRIORITY DATE CLAIMED 14 October 1999 (earliest)	
TITLE OF INVENTION OTOPLASTY FOR BEHIND-THE-EAR (BTE) HEARING AIDS					
APPLICANT(S) FOR DO/EO/US BAYER Erich					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 11. <input type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210). <p>Items 13 to 20 below concern document(s) or information included:</p> <ol style="list-style-type: none"> 13. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 17. <input type="checkbox"/> A substitute specification. 18. <input type="checkbox"/> A change of power of attorney and/or address letter. 19. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 20. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 21. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 22. <input type="checkbox"/> Certificate of Mailing by Express Mail 23. <input checked="" type="checkbox"/> Other items or information: <p style="margin-left: 20px;"> Request for Priority Request for Consideration of Documents Cited in International Search Report Drawings (13 sheets) Letter Regarding Small Entity Status </p>					

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.101) 10/030191	INTERNATIONAL APPLICATION NO. PCT/EP00/10109	ATTORNEY'S DOCKET NUMBER 218082US6PCT
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24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :				CALCULATIONS PTO USE ONLY	
<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	10 - 20 =	0	x \$18.00	\$0.00	
Independent claims	2 - 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,020.00	
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				\$510.00	
SUBTOTAL =				\$510.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$0.00	
TOTAL NATIONAL FEE =				\$510.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$510.00	
				Amount to be: refunded	\$
				charged	\$

- a. ☒ A check in the amount of **\$510.00** to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **15-0030** A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:



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Surinder Sachar
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SIGNATURE

Gregory J. Maier

NAME

25,599

REGISTRATION NUMBER

DATE

Feb. 4 2002

Rec'd PCT/PTO 06 JUN 2002

218082US-6 PCT

#8/a

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
ERICH BAYER : ATTN: APPLICATION DIVISION
SERIAL NO: 10/030,191 :
FILED: 4 February 2002 :
FOR: OTOPLASTY FOR BEHIND-THE-EAR
(BTE) HEARING AIDS

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE SPECIFICATION

Please replace the title on page 1, line 1 with the following:

--OTOPLASTIC FOR BEHIND-THE-EAR HEARING AIDS--.

IN THE CLAIMS

Please cancel claims 1-8 without prejudice.

Please add new claims 9-26 as follows:

9. (New) Earpiece for behind-the-ear parts of hearing acoustics devices, by which a signal conductor that comes from the behind-the-ear device can be positioned in a patient's auditory canal, wherein the earpiece is individually adapted to the patient's anatomy, and a part that provides a hold essentially has a shape of a clip, which follows an outer edge of the

patient's cavum conchae in an arc shape, at least in segments, wherein a shank that follows the outer edge of the cavum conchae makes a transition, above the patient's antitragus, into an angled traverse segment that passes through the cavum conchae, which runs in a direction of the patient's porus acusticus externus, and broadens to hold the signal conductor at its end segment, which comes to rest in an upper region of the patient's auditory canal.

10. (New) Earpiece according to Claim 9, wherein the end segment makes a transition to an auditory canal tab that also comes to rest only in a top region of the patient's auditory canal.

11. (New) Earpiece according to Claim 10, wherein the auditory canal tab has a bore to hold the signal conductor.

12. (New) Earpiece according to Claim 10, wherein the auditory canal tab has a diameter that makes up only a fraction of a diameter of the patient's auditory canal.

13. (New) Earpiece according to Claim 11, wherein the auditory canal tab has a diameter that makes up only a fraction of a diameter of the patient's auditory canal.

14. (New) Earpiece for behind-the-ear parts of hearing acoustics devices, by which a signal conductor that comes from the behind-the-ear device can be positioned in a patient's auditory canal, wherein the earpiece, at a part that provides a hold, is individually adapted to the patient's anatomy, wherein the part of the earpiece that provides the hold is held in the patient's cymba, countersunk and fitted, and carries a clip that passes over an edge of the patient's external ear in a shape of an arc, and an end of the clip forms a holder for the signal conductor.

15. (New) Earpiece according to Claim 14, wherein the clip is broadened at the end of the clip and forms a sound tube eye.

16. (New) Earpiece according to Claim 14, wherein the part of the earpiece that provides the hold extends into a region of the patient's crus anthelicis.

17. (New) Earpiece according to Claim 15, wherein the part of the earpiece that provides the hold extends into a region of the patient's crus anthelicis.

18. (New) Earpiece according to Claim 9, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

19. (New) Earpiece according to Claim 10, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

20. (New) Earpiece according to Claim 11, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

21. (New) Earpiece according to Claim 12, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

22. (New) Earpiece according to Claim 13, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

23. (New) Earpiece according to Claim 14, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

24. (New) Earpiece according to Claim 15, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

25. (New) Earpiece according to Claim 16, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

26. (New) Earpiece according to Claim 17, for use with cochlear implant microphones, CI BTE processors, BTE tinnitus systems, or broad-band noise systems.

IN THE ABSTRACT

Please cancel the original Abstract on page 11 in its entirety and insert therefor:

ABSTRACT

An otoplastic for production of behind-the-ear hearing aids. The hearing aid includes a preferably flexible signal conductor, for example an acoustic tube that can be positioned in the auditory canal, whereby the otoplastic matches the individual anatomy of the patient and its locating part is essentially in the form of a clip, which, at least partly arched, follows the outer edge of the patient's cavum conchae. A branch that follows the edge of the cavum conchae transforms, above the patient's antitragus, into a bent crosspiece that traverses the cavum conchae and runs in the direction of the patient's porous acusticus externus. The end section of the crosspiece lies in the upper section of the auditory canal and widens to accept the signal conductor.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present preliminary amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present preliminary amendment original claims 1-8 are canceled and new claims 9-26 are presented for examination. New claims 9-26 are deemed to be self-evident from the original disclosure, including original claims 1-8, and thus are not deemed to raise any issues of new matter. Further, new claims 9-26 are not believed to be more narrow in scope in any aspect in comparison with original claims 1-8.

A new Abstract believed to be in more proper format under United States practice is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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218082US-6 PCT

Marked-Up Copy

Serial No: 10/030,191

Amendment Filed on:

6-6-02

IN THE SPECIFICATION

Please replace the title on page 1, with the following:

[OTOPLASTY FOR BEHIND-THE-EAR (BTE) HEARING AIDS] OTOPLASTIC FOR
BEHIND-THE-EAR HEARING AIDS

IN THE CLAIMS

--Claims 1-8 (Canceled).

Claims 9-26 (New).

IN THE ABSTRACT

(New).--

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13/PK15

JC03 Rec'd PCT/PTC 04 FEB 2002
PCT/EP00/10109

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Specification

Otoplasty for Behind-the-Ear (BTE) Hearing Aids

The invention relates to an ear fitting piece, i.e. an earpiece for behind-the-ear (BTE) devices in the field of hearing acoustics. These devices are also frequently referred to as BTE-secret ears (SE). In this connection, a relatively short sound tube is used, making it possible to noticeably reduce friction losses, particularly in the high-frequency sonic range.

However, the sound tube must be precisely positioned in or on the auditory canal, and for this purpose, an ear fitting piece, i.e. an earpiece is regularly used, which is individually adapted to the human anatomy of the ear of the patient to be treated. Up to the present date, various forms of earpieces have become common, with some, namely the so-called "open" BTE earpieces, being particularly preferred, in order to have the minimum possible effect on the auditory canal, caused by partially covering or closing it off in some regions, with a "foreign body." These "open" BTE devices have the further advantage that the hearing capacity that still exists is impaired as little as possible in terms of its natural effect.

Known relevant earpieces are known as "SE shell shape, SE clip shape, or SE claw shape" (See Ulrich Voogdt: Otoplastik - Die individuelle Otoplastik zur Hörgeräte-Versorgung ... [Earpieces - Individual earpieces for hearing aids ...], Volume 2 of the scientific series "Akademie für Hörgeräte-Akustik" [Academy for hearing device acoustics], Median-Verlag of Killisch-Horn GmbH, 1993). A modified version of these common earpieces is the "open" solution. However, all of the variants have the common feature that it is frequently not possible to make the hearing correction as natural as possible.

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It is therefore the task of the invention to create an earpiece for "open" BTE hearing aids, for CI components (cochlear implant microphone systems and CI BTE processors), or BTE tinnitus systems, which are characterized not only by a minimal feeling of wearing a foreign body, and good wearing comfort, but primarily in that natural sound processing in the human ear can be utilized with as little distortion as possible, in order to ensure a maximum degree of hearing correction and sense of natural hearing.

This task is accomplished by an earpiece according to Claim 1 and/or according to Claim 5.

With the earpiece according to the invention, in accordance with Claim 1, it is possible to keep the auditory canal open at the decisive points, to a degree that has not been achieved until now. The invention is based on the consideration that the sense of natural hearing, on the one hand, and the effectiveness of the hearing correction, on the other hand, are significantly influenced by the anatomically determined, natural resonance conditions in the auditory canal, including the external ear. Using the structure of the earpiece according to the invention, the natural resonance remains largely unaffected, even if the auditory canal is very narrow. In this connection, there are the additional advantages that the wearing comfort is extremely good (material-free region in the region of the crus helicis; no accumulation of heat), that the earpiece requires very little material and therefore also has cosmetic advantages, and that acoustic coupling for influencing the frequency and the dynamics can take place more free of complications.

Although the earpiece according to the invention takes up less room, it can reliably fulfill the function of stabilizing the sound tube, in that the coupling between the sound tube and the BTE device is utilized for stabilization.

It has been shown that the support elements of the earpiece are positioned in such a stable manner, in spite of the reduced contact area with the cavum conchae, that the end segment of the earpiece traverse part can carry an auditory canal tab, in accordance with the further development in Claim 2, making it possible to achieve better support in the auditory canal.

The task stated above is accomplished in accordance with a second alternative in accordance with Claim 5, in that the earpiece is, for the first time, positioned at a location of the external ear that lies entirely outside of the cavum conchae. It has surprisingly been shown that when positioning the part of the earpiece that provides the hold in the cymba, it is easily possible, in interaction with the inherent stability of the flexible signal conductor or the sound tube, to precisely and reproducibly position the latter in the auditory canal, which is no longer blocked off by an earpiece component, according to the invention. In this way, this earpiece is particularly well suited, in addition to "open" standard applications, for applications in children with deafness in one ear, or, for example, for students with normal hearing but with a so-called reading/spelling weakness, in connection with so-called FM (frequency modulation) systems in which the teacher's speaking signal is fed into the auditory canal of the hearing-challenged child via a microphone and a microport system. Particularly in this case, utilization of the natural auditory canal resonance is very important, and this is achieved by the earpiece according to the invention, to a degree that has not been achieved until now. Because of the improved general conditions, it is furthermore easier to undertake acoustical coupling of the hearing device to the frequency and dynamics influencing system, so that the earpiece according to the invention is also well suited for use in media, e.g. during live television interviews, as a type of "in-ear monitoring," where in this case, a simultaneous translation, for example, or the voice signal of a

prompter, are fed into the auditory canal under the most natural conditions possible.

A particular advantage of the earpiece according to Claim 5 can be seen in that there is great freedom with regard to the structure of the clip that goes around the external ear in the shape of an arc, which in turn can be utilized for additional stabilization of the earpiece. The further development according to Claim 6 goes in this direction.

If the main body of the earpiece that provides the hold is extended into the region of the crus anthelicis, according to Claim 7, stabilization of the main body is further improved, which makes it possible to further reduce the size of the main body. At the same time, this improves the wearing comfort, and it also has advantages in terms of cosmetics.

This embodiment, also, just like the embodiment according to Claim 1, has the advantage that it can be used without complications for specific special applications, such as a very narrow auditory canal or a lot of hair at the end of the auditory canal, or other anomalies of the ear anatomy.

Further developments of the invention are the object of the other dependent claims.

In the following, exemplary embodiments of the invention will be explained in greater detail, using the schematic drawings. These show:

Fig. 1: a view of an ear from the side, with the earpiece according to the first embodiment inserted in it;

Fig. 2: cross-section II-II in Fig. 1;

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Fig. 3, Fig. 4: on a larger scale, representations of an actual manufactured earpiece of the embodiment according to Fig. 1, 2;

Fig. 5: a view of an earpiece placed in an external ear, according to the construction corresponding to the first embodiment;

Fig. 6: a view of an ear from the side, with the earpiece according to the second embodiment inserted in it;

Fig. 7: cross-section VII-VII in Fig. 6;

Fig. 8, Fig. 9: on a larger scale, representations of an actual manufactured earpiece of the embodiment according to Fig. 6, 7;

Fig. 10: an enlarged view of another embodiment of the earpiece, with a main body of a smaller size; and

Fig. 11: a view of an earpiece according to Fig. 10, placed in an external ear;

Fig. 1 shows an earpiece, with the reference number 20, for a BTE device, which is used in the cavum conchae, referred to with the reference number 22. The crus helicis is referred to with the reference number 24, and the auditory canal, i.e. the meatus acusticus externus, is referred to with the reference number 26.

The earpiece serves to stabilize a sound tube 28 that leads to the BTE device, not shown, which tube opens into the auditory canal. For this purpose, the earpiece is individually adapted to the anatomy of the patient, for example by means of an impression-taking procedure. It essentially has the shape of a clip with two

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shanks 32, 34. The first shank extends in arc shape along the outer edge 36 of the cavum conchae 22 up to a point above the antitragus, referred to as 30. From there, the earpiece runs at an angle, upward, via a second shank that passes through the cavum conchae, which will be referred to as the traverse segment 34 in the following. The traverse segment runs in the direction of the porus acusticus externus 38 and there widens to an end segment 40, which serves to hold the signal conductor, in the case shown here, a sound tube angle piece 42.

As is evident from Fig. 2, the end segment 40 makes a transition into an acoustical canal tab 44 in which a bore 46 (shown with broken lines) is formed.

From the drawing, it is evident that the earpiece covers the auditory canal 26 only slightly, so that the natural auditory canal/external ear resonance is maintained. Additional stabilization of the earpiece 20 is achieved with the sound tube 28, which is rigidly connected with the angle piece 42.

In Figures 3 and 4, which show an earpiece according to Figures 1 and 2, made of plastic, the filigree structure is clearly evident, but nevertheless the earpiece can be fixed in place in the cavum conchae, in stable manner.

The cosmetic aspect of the earpiece according to the invention is best evident from Figure 5, in which the visible surface of the earpiece 20 is shown with hatched lines. It is obvious that the design according to the invention is such that it has practically no detrimental effect on the natural appearance of the external ear.

Figures 6 to 11 show additional embodiments of the earpiece according to Claim 5.

The earpiece, which again is emphasized with hatched lines, as also in Figures 1 and 2, is referred to with the reference number 120. It is arranged in such a way that the cavum conchae remains entirely free. Instead, the earpiece is arranged in the region of the cymba conchae 50, and, in the case shown, with an extension into the region of the crus anthelicis 52, 54.

Again, the earpiece is individually adapted to the anatomy of the patient, and consists essentially of two components, namely the part 156 that provides the hold, which is shaped to fit into the cymba conchae 50, and a hill 160, which forms the holder for the flexible sound tube 128 at its end. The sound tube 128 is inserted at an angle into the interior of the auditory canal 26, as shown in Fig. 7, and can have a so-called cerum defender 162 there, for example.

This embodiment of the earpiece has an even smaller structural volume than the earpiece according to Figures 1 to 5, and, as is evident from Fig. 7, it has almost no influence on the auditory canal.

Figures 8 and 9 show an earpiece used in practical situations, on a larger scale. The surface structure of the main body, with its multiple curves, is clearly evident; this is responsible for the accurate fit and secure seat in the cymba conchae, which prevents it from being moved. The embodiment according to Fig. 8, 9 was produced for a patient with a rather large-volume cymba conchae.

Figures 10 and 11 show another embodiment that was used for a patient with a significantly smaller cymba conchae. The earpiece, designated as 220, has a significantly smaller main body 256, which

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again is spatially curved in many places, so that the necessary undercut with the surface of the ear comes about.

From the view according to Fig. 11, it is evident that the visible part of the earpiece 220 is kept to a minimum.

Of course, all the usual materials can be used for the earpieces according to the invention, such as hot-polymerized and cold-polymerized PMMA or photopolymerizate. Because of the low volume of the earpiece, colored designs, possibly with jewelry-like applications, are also possible. Also, metals such as stainless steel, gold, silver, platinum, titanium (injection-molding or spin-casting process) can be used, and it is also possible to work with galvanic technology.

Claims

1. Earpiece for behind-the-ear (BTE) parts of hearing acoustics devices, by means of which a signal conductor, preferably a flexible one, that comes from the BTE device, such as a sound tube (28), can be positioned in the auditory canal, where the earpiece is individually adapted to the anatomy of the patient, and its part that provides the hold essentially has the shape of a clip, which follows the outer edge (36) of the cavum conchae (22) in an arc shape, at least in segments, characterized in that a shank (32) that follows the edge of the cavum conchae makes a transition, above the antitragus (30), into an angled traverse segment (34) that passes through the cavum conchae, which runs in the direction of the porus acusticus externus, and broadens to hold the signal conductor (42) at its end segment (40), which comes to rest in the upper region of the auditory canal (26).
2. Earpiece according to Claim 1, characterized in that the end segment (40) makes a transition to an auditory canal tab (44) that also comes to rest only in the top region of the auditory canal (26).
3. Earpiece according to Claim 2, characterized in that the auditory canal tab (44) has a bore (46) to hold the signal conductor (42).
4. Earpiece according to Claim 2 or 3, characterized in that the auditory canal tab (44) has a diameter that makes up only a fraction of the diameter of the auditory canal (26).
5. Earpiece for behind-the-ear (BTE) parts of hearing acoustics devices, by means of which a signal conductor, preferably a flexible one, that comes from the BTE device, such as a sound tube (128), can be positioned in the auditory canal, where the earpiece, and particularly the part of it that provides the hold, is individually adapted to the anatomy of the patient, characterized

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in that the part (156) of the earpiece (120) that provides the hold is held in the cymba (50), countersunk and fitted, and carries a clip (160) that passes over the edge (58) of the external ear in the shape of an arc, the end of which clip forms the holder for the flexible signal conductor (128).

6. Earpiece according to Claim 5, characterized in that the clip (160) is broadened at the end and forms a sound tube eye.

7. Earpiece according to Claim 5 or 6, characterized in that the main body (156) that provides the hold extends into the region of the crus anthelicis (54).

8. Earpiece according to one of Claims 1 to 7, characterized by use with cochlear implant microphones or CI BTE processors, with BTE tinnitus systems, such as broad-band noise systems (maskers or soft maskers).

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Abstract

The invention relates to an otoplastic for production of behind-the-ear hearing aids. Said hearing aid comprises a preferably flexible signal conductor, such as e.g. an acoustic tube (28) which can be positioned in the auditory canal, whereby the otoplastic matches the individual anatomy of the patient and its locating part is essentially in the form of a clip, which, at least partly arched, follows the outer edge (36) of the cavum conchae (22). A branch (32) which follows the edge of the cavum conchae transforms, above the antitragus(30), into a bent crosspiece (34) which traverses the cavum conchae and runs in the direction of the porus acusticus externus. The end section (40) of said crosspiece (34) lies in the upper section of the auditory canal (26) and widens to accept the signal conductor (42).

Fig. 1

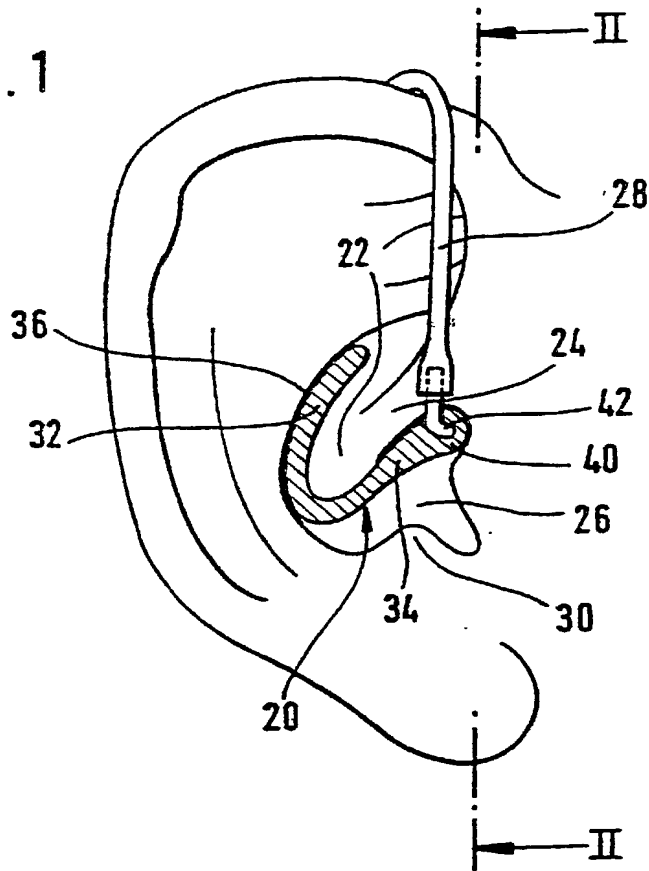
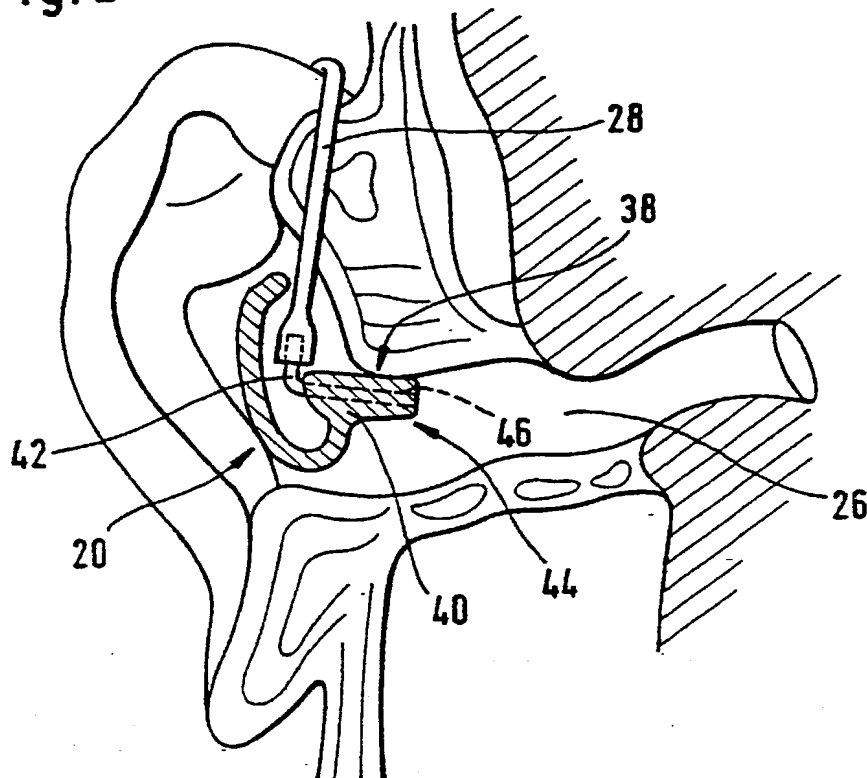


Fig. 2



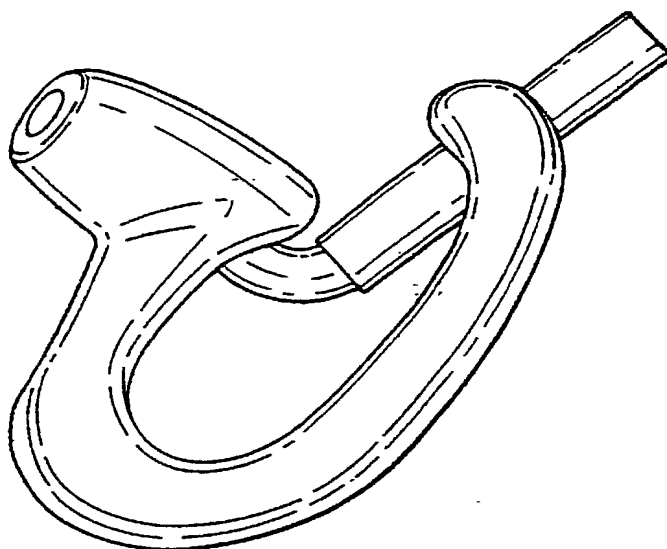


Fig. 3

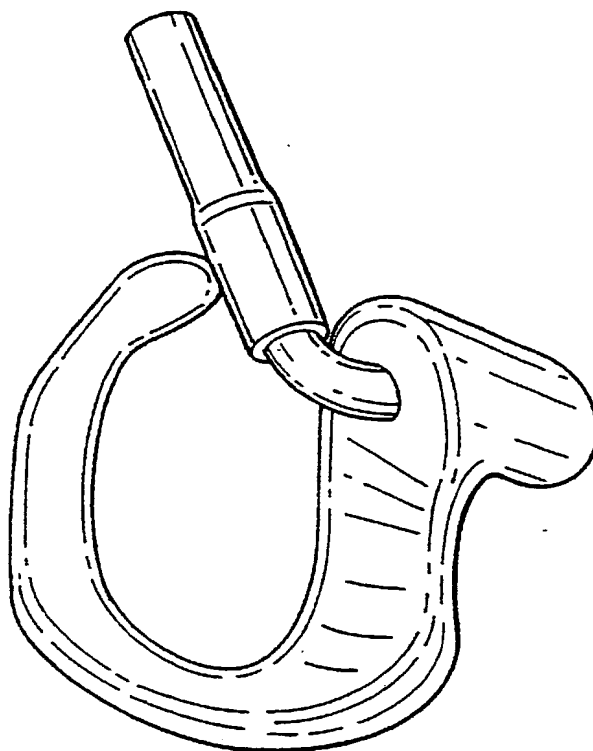


Fig. 4

Fig. 5

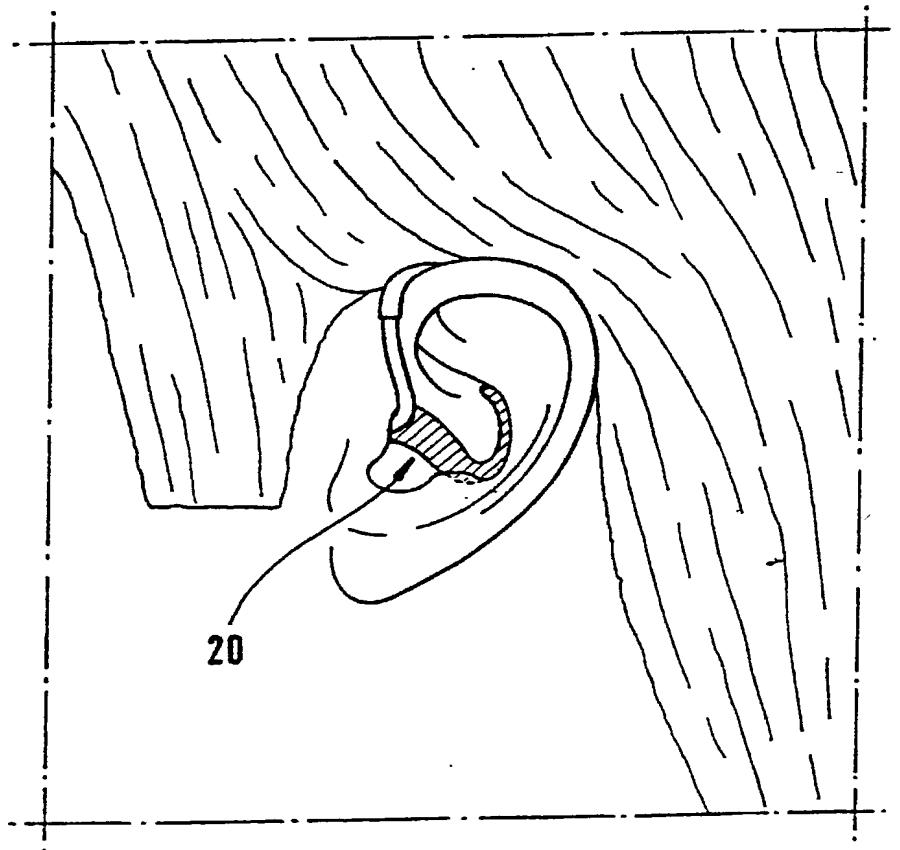


Fig. 6

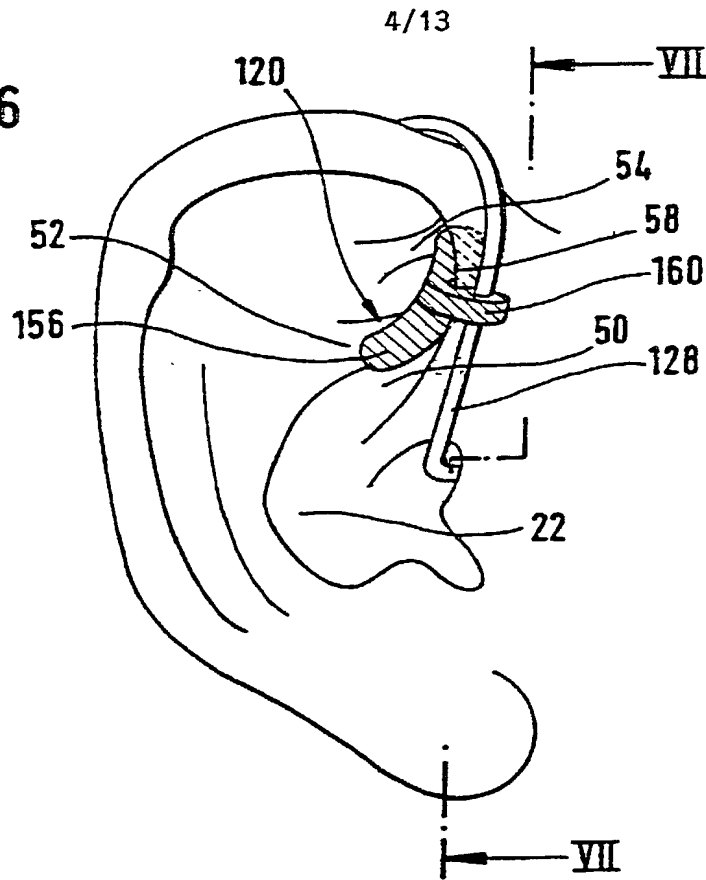


Fig. 7

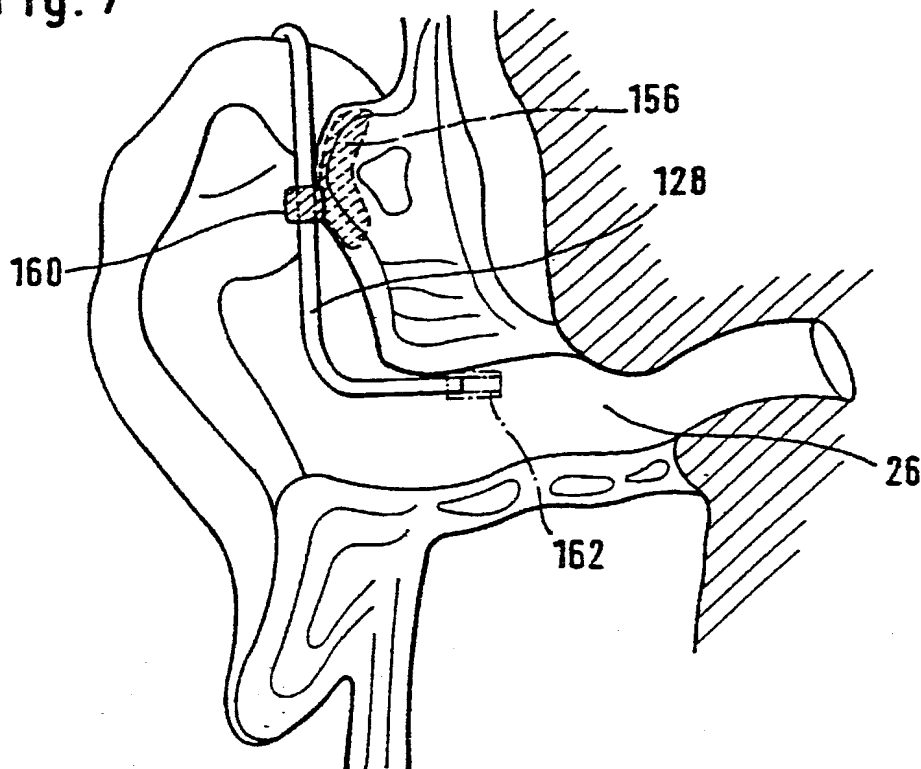


Fig. 8

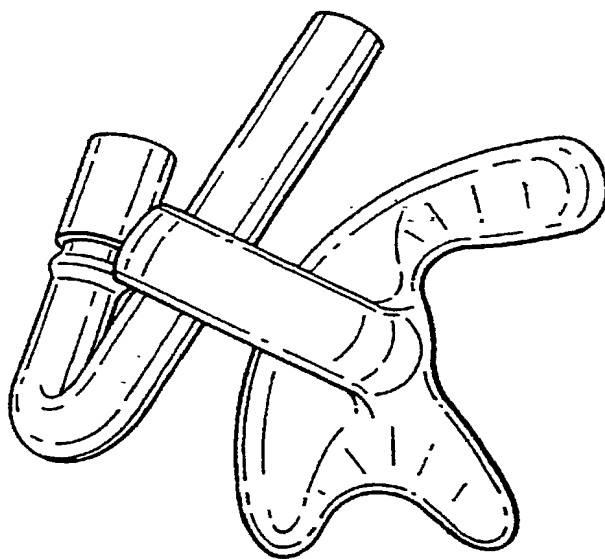


Fig. 9

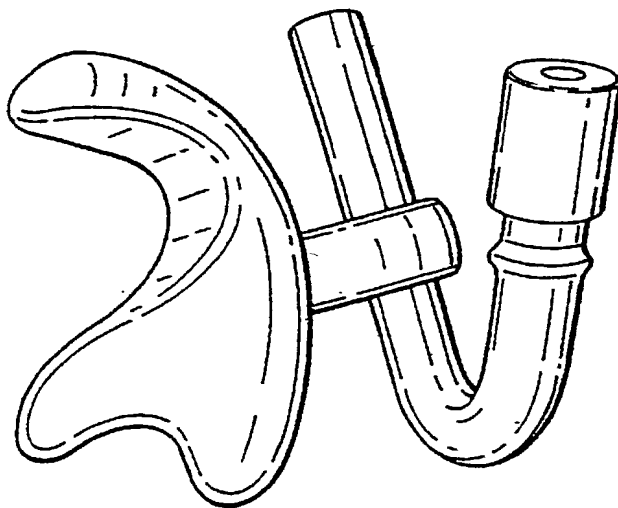


Fig. 10

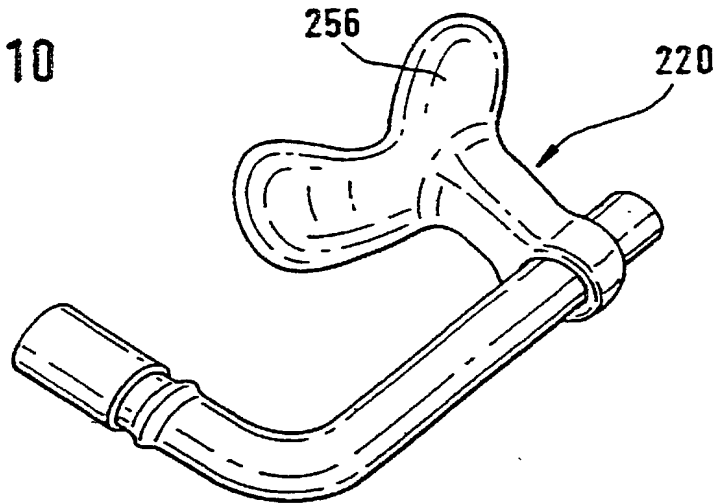
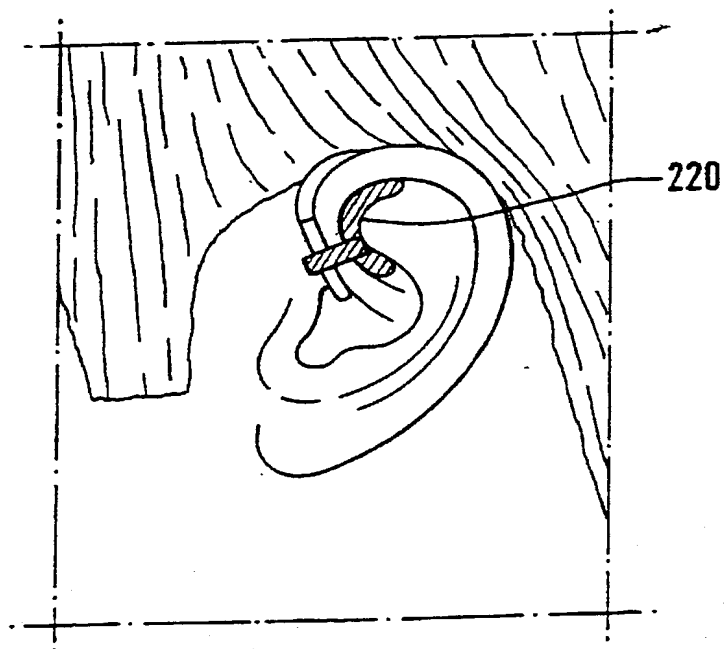


Fig. 11



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Fig. 12

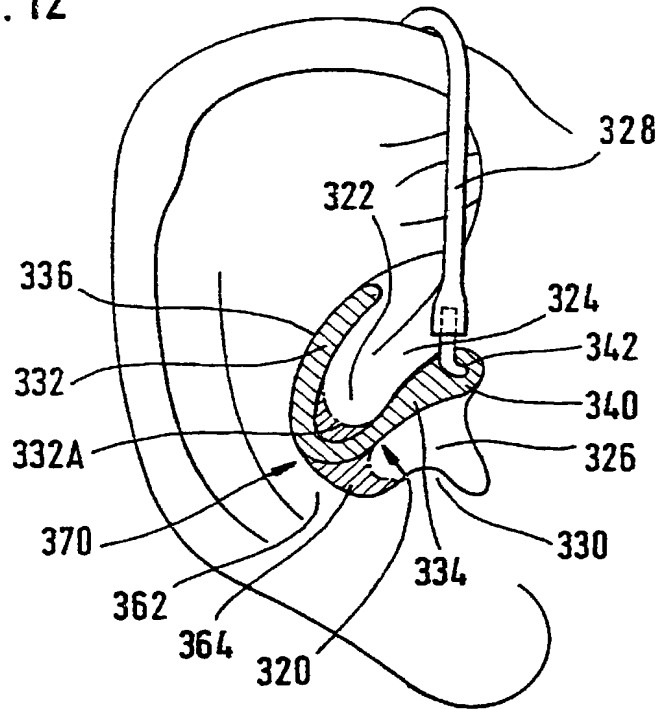


Fig. 13

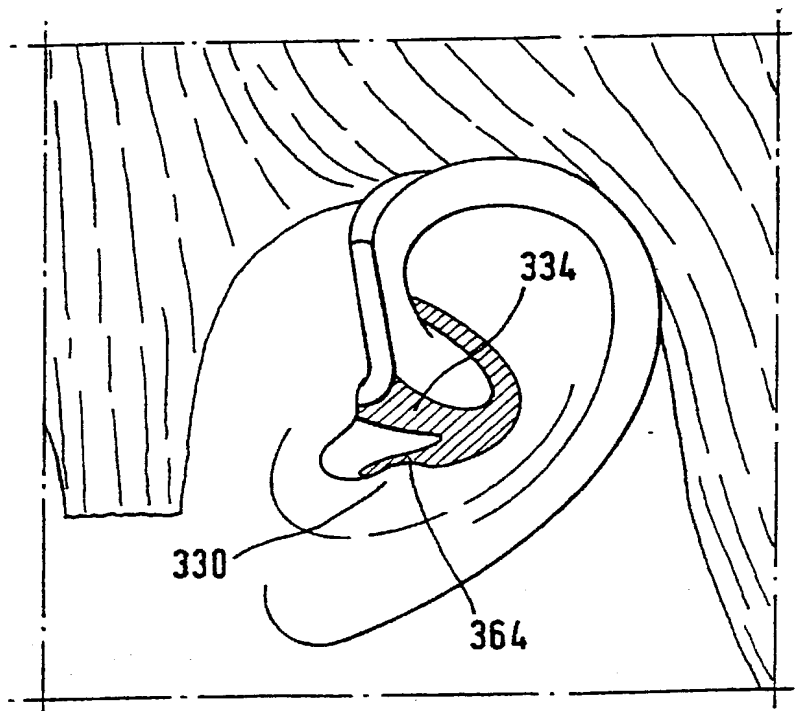


Fig. 14

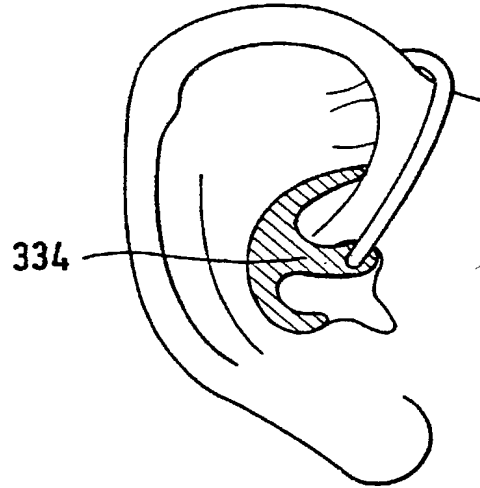


Fig. 15

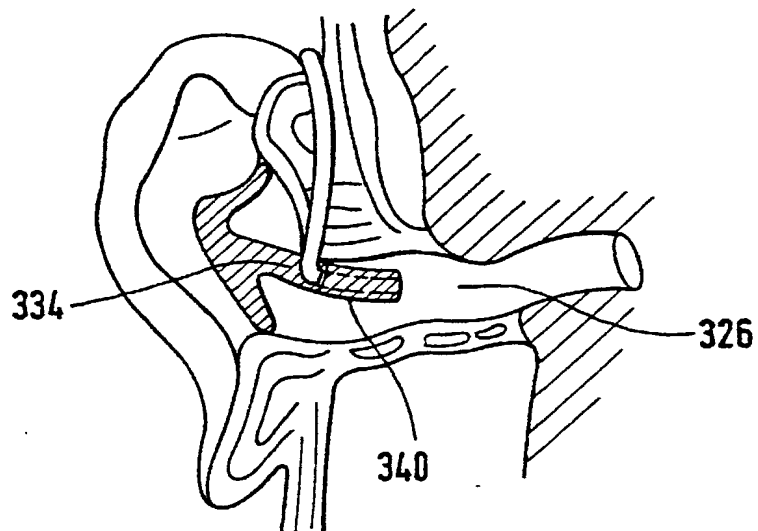


Fig. 16

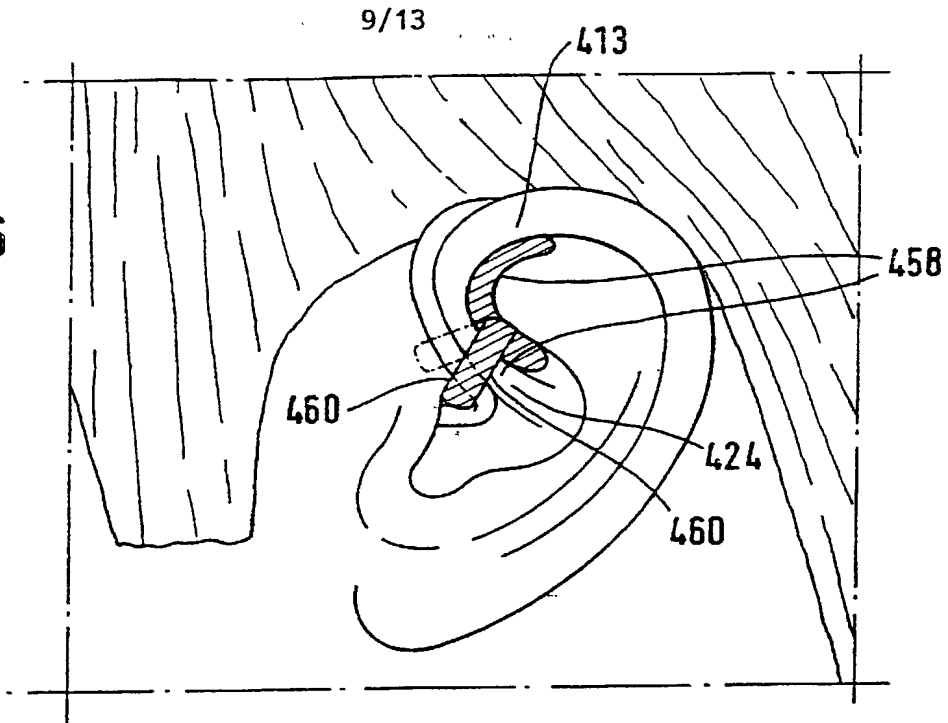


Fig. 17

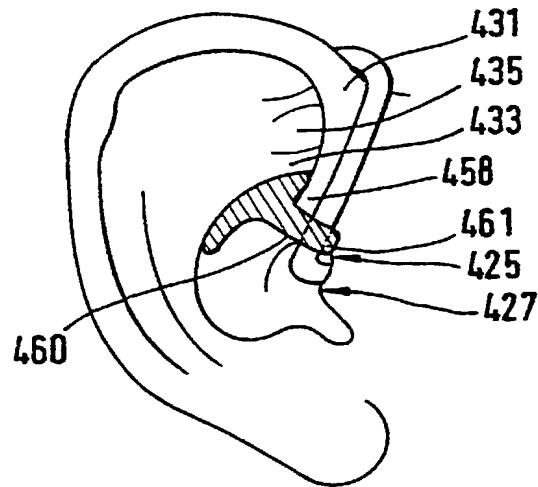


Fig. 18

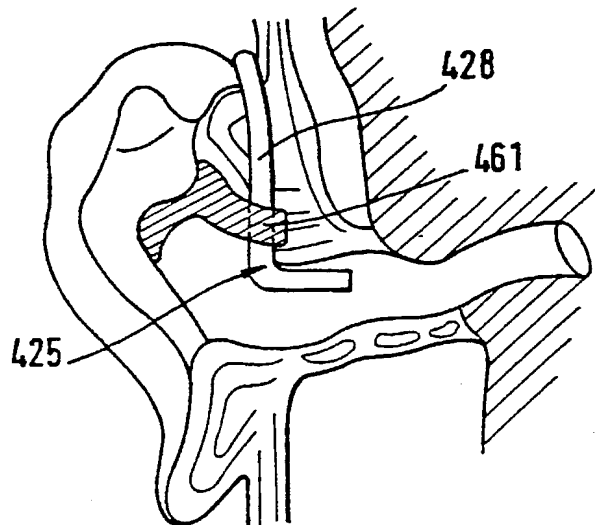


Fig. 19

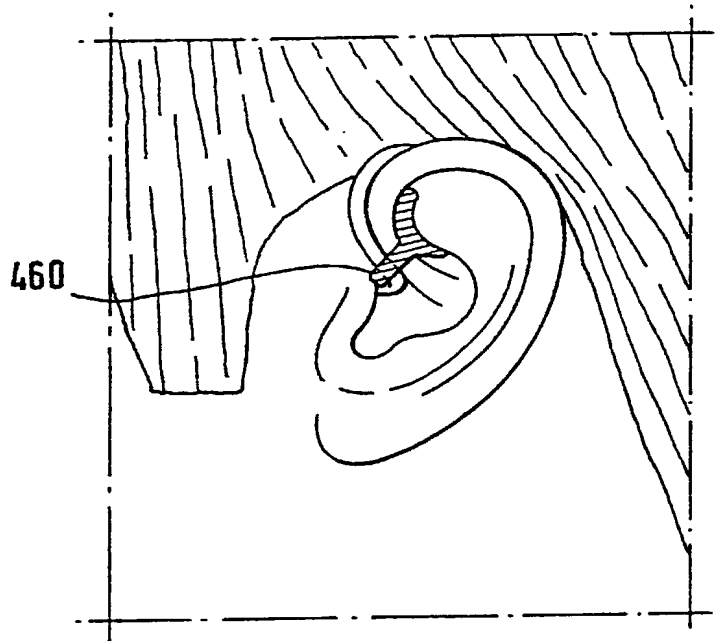


Fig. 20

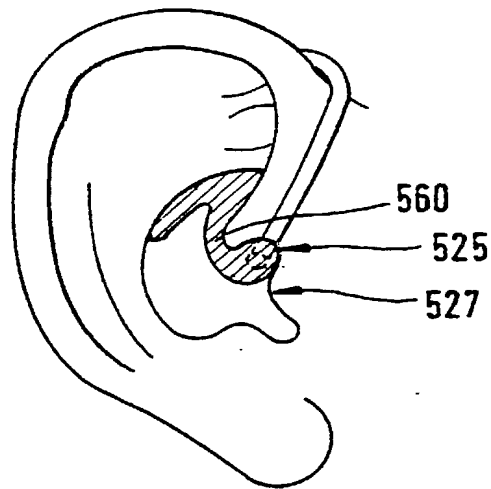


Fig. 21

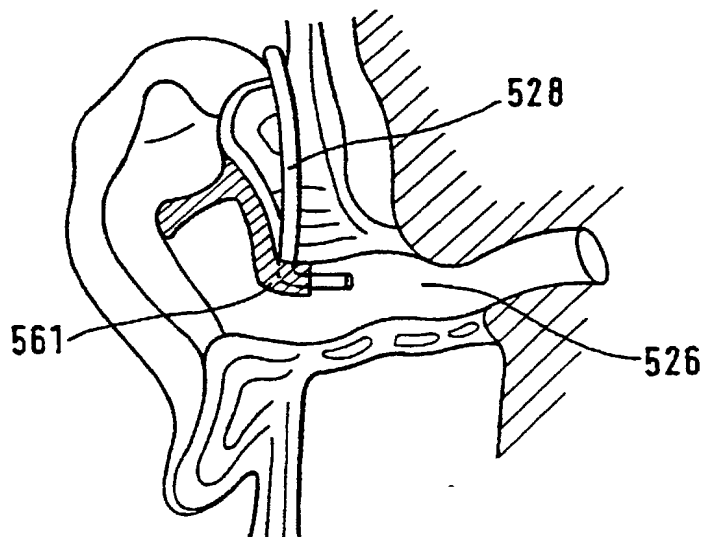


Fig. 22

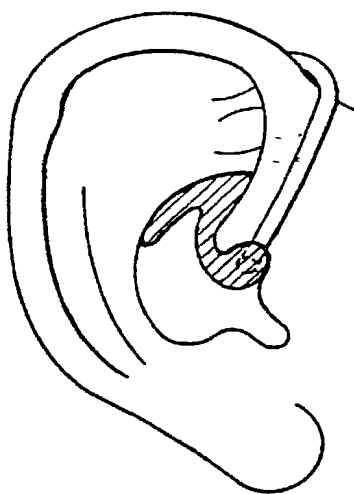
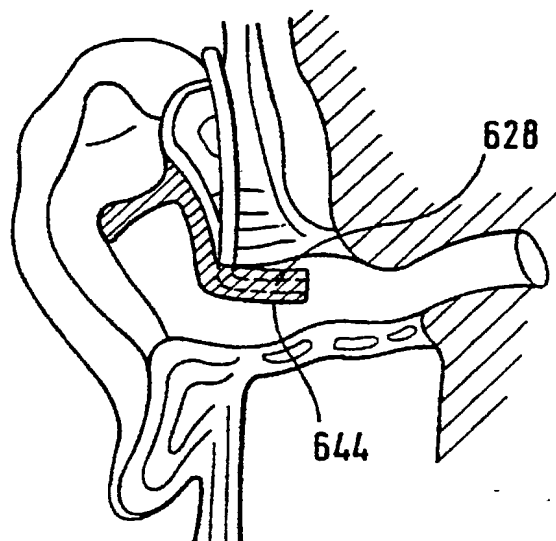


Fig. 23



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Fig. 24

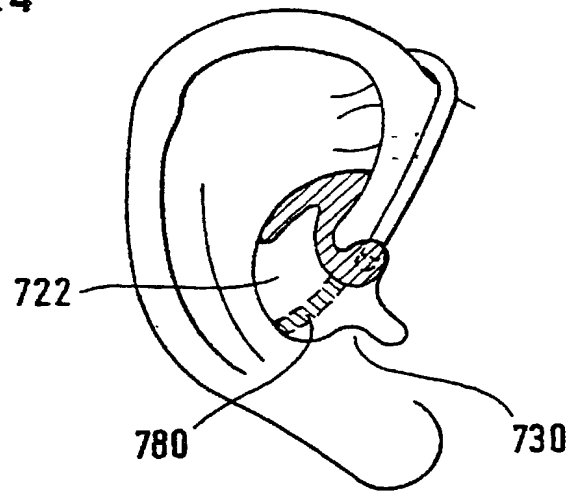
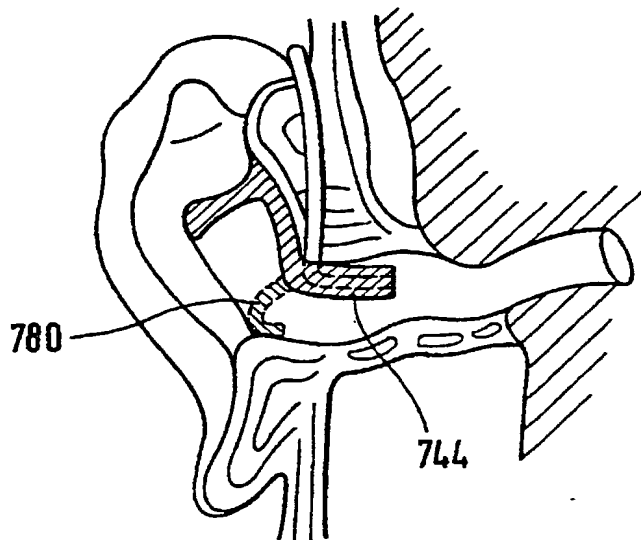


Fig. 25



Declaration and Power of Attorney for Patent Application

Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

Deren Beschreibung:

- ☐ ist beigefügt
- ☐ wurde angemeldet am _____

unter der US-Anmeldenummer oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT)

_____ und am _____
_____ Abgeändert (falls zutreffend).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

OTOPLASTIC FOR BEHIND-THE-EAR HEARING AIDS

the specification of which

- ☐ is attached hereto.
- ☒ was filed on February 4, 2002

as United States Application Number or PCT International Application Number

10/030,191 and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

German Language Declaration

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title 35, US-Code, § 119(a)-(d), bzw. § 365(b) aller unten aufgeführten Auslandsanmeldungen für Patente oder Erfinderurkunden, oder § 365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen für Patente bzw. Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

Prior Foreign Application(s)
(Frühere ausländische Anmeldungen)

<u>299 18 139.1</u> (Number) (Nummer)	<u>Germany</u> (Country) (Land)
<u>200 09 908.6</u> (Number) (Nummer)	<u>Germany</u> (Country) (Land)

Ich Beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

<u> </u> (Application No.) (Aktenzeichen)	<u> </u> (Filing Date) (Anmeldetag)
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Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

<u>PCT/EP00/10109</u> (Application No.) (Aktenzeichen)	<u>October 13, 2000</u> (Filing Date) (Anmeldetag)
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<u> </u> (Application No.) (Aktenzeichen)	<u> </u> (Filing Date) (Anmeldetag)
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Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachten Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

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Priority Claimed
Priorität
beansprucht

<u>14 October 1999</u> (Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung)	<input checked="" type="checkbox"/> <input type="checkbox"/> Yes No Ja Nein
<u>2 June 2000</u> (Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung)	<input checked="" type="checkbox"/> <input type="checkbox"/> Yes No Ja Nein

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

<u> </u> (Application No.) (Aktenzeichen)	<u> </u> (Filing Date) (Anmeldetag)
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I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

<u> </u> (Status: Patented, Pending, Abandoned) (Status: patentiert, schwebend, aufgegeben)	<u> </u> (Status: Patented, Pending, Abandoned) (Status: patentiert, schwebend, aufgegeben)
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<u> </u> (Status: Patented, Pending, Abandoned) (Status: patentiert, schwebend, aufgegeben)	<u> </u> (Status: Patented, Pending, Abandoned) (Status: patentiert, schwebend, aufgegeben)
--	--

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)



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(703) 413-3000

Vor- und Zuname des einzigen oder ersten Erfinders	1-00	Full name of sole or first inventor	
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Postanschrift		Mailing Address	
		same as above	